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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Nevein T. SULTAN, et al		
Serial No.:	09/899,265		
Filed:	July 6, 2001		
Title:	Policy-Based Forwarding In Open Shortest Path First (OSPF) Networks		
Group Art Unit:	2152		
Examiner:	Ramsey REFAI		Tel: 571-272-3975
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APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

Pursuant to 37 C.F.R. § 1.191, the Applicant submitted a Notice of Appeal from the Examiner to the Board of Patent Appeals and Interferences on January 7, 2008. Specifically, the Applicant takes appeal from the Examiner's rejection of claims 1-8, 10-15, 17-25 and 27-29 under 35 U.S.C. § 102(e). The Notice of Appeal was filed in response to the Final Action mailed October 30, 2007 and Advisory Action mailed December 21, 2007. Pursuant to 37 C.F.R. § 1.192, the Applicant now submits the following brief.

1) Real Party in Interest

The real party of interest is Nortel Networks Limited., by virtue of:

- an assignment executed by the inventors in favour of Nortel Networks Limited. recorded at Reel/Frame 011971/0880.

2) Related Appeals and Interferences

None.

3) Status of Claims

Pursuant to the Final Action mailed October 30, 2007, the status of the claims is as follows:

- claims 1-8, 10-15, 17-25 and 27-29 stand rejected under 35 U.S.C. § 102(e) as being anticipated by United States Patent No. 6,275,492.(Zhang).

Claims 1-8, 10-15, 17-25 and 27-29 are in the present Appeal.

4) Status of Amendments

Applicant's response filed December 10, 2007 to the Final Action mailed October 30, 2007 contained no claim amendments. Accordingly, the claims currently stand as amended in Applicant's response filed on January 16, 2007. A copy of the current claims is provided in the Claims Appendix below.

5) Summary of Claimed Subject Matter

As is well known in the art, in a data network (such as an Open Shortest Path First - OSPF network), traffic forwarding is typically controlled by forwarding (or routing) tables maintained by each router in the network. The forwarding table(s) of each node is(are) constructed using information received by Link State Advertisements (LSAs) received by the node. The present invention is directed to methods and systems for enabling policy-based control over traffic forwarding within the network, by modifying the way in which LSAs are propagated through the network, which in turn controls the information contained in the forwarding tables of each node of the network. Claims 1, 12 and 25 are independent claims.

Claim 1 defines a method of enabling policy-based traffic forwarding in a data network [2 , FIG. 1] having at least two area border routers (ABRs) [8a-b and 12, FIG. 1], the method comprising steps of:

generating a link state advertisement (LSA) message [36, 54 and 62, FIG. 3], and asserting a route tag in respect of the generated LSA message [paragraph 42]; and

at each ABR receiving the LSA message, controlling propagation of the received LSA, into an area of the data network hosted by the ABR, using a respective forwarding policy having a match criteria corresponding to the asserted route tag [paragraph 42-43];

wherein the respective forwarding policy of a first ABR differs from that of a second ABR [paragraph 45 et seq.], such that the received LSA message is flooded into the area hosted by the first ABR, and not flooded into the respective area hosted by the second ABR [paragraph 38].

Claim 12 defines A router [8a-b and 12, FIG. 1] for enabling policy-based traffic forwarding in a data network [2 , FIG. 1] having at least two routers, the router [8a-b and 12, FIG. 1] comprising means for controlling propagation of a received link state advertisement (LSA) message [36, 54 and 62, FIG. 3], into an area of the data network [4a-c, FIG. 1] hosted by the router, using a respective forwarding policy having a match criteria corresponding to a route tag asserted in respect of the LSA [paragraph 42], wherein the forwarding policy of the router differs from that of a second router [paragraph 45 et seq.], such that the received LSA message is flooded into the area hosted by the router, and not flooded into a respective second area hosted by the second router [paragraph 38].

Claims 25 defines A software program stored on a computer readable medium for controlling a router [8a-b and 12, FIG. 1] to enable policy-based traffic forwarding in a data network [2 , FIG. 1] having at least two routers [8a-b and 12, FIG. 1], each router hosting an area [4a-c, FIG. 1] of the data network, the software program comprising program code adapted to control propagation of a received link state advertisement (LSA) message [36, 54 and 62, FIG. 3], into a respective area [4a-c, FIG. 1] of the data network hosted by the router, using a respective forwarding policy having a match criteria corresponding to a route tag asserted in respect of the LSA [paragraph 42], wherein the respective forwarding policy of a first router

differs from that of a second router [paragraph 45 et seq.], such that the received LSA message is flooded into the area hosted by the first router, and not flooded into a respective second area hosted by the second router [paragraph 38]:

6) Grounds of Rejections to be Reviewed on Appeal

The following grounds of rejection are presented for review in the present appeal:

- Whether claims 1-8, 10-15, 17-25 and 27-29 are unpatentable under 35 U.S.C. § 102(e), over the teaching of United States Patent No. 6,275,492.(Zhang)

7) Argument

For the sake of brevity, the following arguments are focussed on independent claims 1, 12 and 25, which are believed to be dispositive of the issues raised in the present appeal.. In Section 1 of the Final Office Action mailed October 30, 2007, the Examiner argues:

- "Webster defines the term "rule" as "a prescribed guide for conduct or action". Forwarding data can be interpreted by one skilled in the art as differing forwarding "rules" since each forwarding data contains differing guides for action."

- "the propagation of LSAs is clearly taught by Zhang using routing tables generated by each router. In column 3, lines 24-30, Zhang teaches that the transmission of the LSAs to network devices in a router's network area. The router advertises the LSAs to specific areas. In column 3, line 40-column 4, line 22, Zhang teaches that, based on information received from the LSAs, each router calculates routes to various destinations in the network. Routing tables are generated containing these destinations and the method of routing data to these destinations"

In the Advisory Action mailed December 21, 2007, the Examiner expanded on the first of the above arguments, thus:

> "... forwarding data routes packets based on the destination address. This forwarding of data is based on match criteria, which is the destination address The packets are specifically forwarded to the destination address in the forwarding table. Therefore, the forwarding data can be interpreted by one skilled in the art as a forwarding rule."

With reference to the Examiner's arguments regarding the terms "rule" and "forwarding rule", Applicant notes that neither of these terms appear in the claims. To the extent that either of these terms might be treated as somehow synonymous with the term "forwarding policy", it will be noted that the claims do not refer to forwarding policies in any generic sense, but rather to a forwarding policy having a specific match criterion. More specifically, claims 1, 12 and 25 all explicitly define that a route tag is asserted in respect of a generated Link State Advertisement (LSA) message, and that each ABR that receives the LSA message controls propagation of the received LSA, into an area of the data network hosted by the ABR, using a respective forwarding policy having a match criteria corresponding to the asserted route tag.

Obviously, a "route tag" is not a "destination address".

According to the Examiner, "forwarding data routes packets based on the destination address. This forwarding of data is based on match criteria, which is the destination address The packets are specifically forwarded to the destination address in the forwarding table." However, since the claimed forwarding policy does not utilize the destination address, it makes no difference whether or not the Examiner considers forwarding data to be a forwarding rule or policy of some sort; any rule or policy that utilizes the destination address fails to meet the limitations of the claims.

For even greater certainty, Applicant notes that even if obvious difference between a route tag and a destination address is overlooked, the Examiner's alleged forwarding rule still fails to meet the claim limitation. In particular, claims 1, 12 and 25 require that "the respective forwarding policy of a first ABR differs from that of a second ABR, such that the received LSA message is flooded into the area hosted by the first ABR, and not flooded into the respective area hosted by the second ABR". Thus the claims explicitly define that the claimed forwarding

policy controls the flooding behaviour of the ABR. However, the Examiner admits that his alleged "forwarding rule" does not do this. Instead, according to the Examiner, "[t]he packets are specifically forwarded to the destination address in the forwarding table".

Obviously, specifically forwarding packets to a destination address is entirely different from flooding LSAs into an area hosted by the ABR.

As such, it makes no difference whether or not the forwarding data somehow constitutes a forwarding policy, and it does not matter if there is different forwarding data in different routers, nor whether or not this different forwarding data is somehow equivalent to having different forwarding policies. Any arrangement that operates such that "packets are specifically forwarded to the destination address in the forwarding table" fails to meet the limitations of the claims.

Regarding the Examiner's assertion that "the propagation of LSAs is clearly taught by Zhang using routing tables generated by each router", applicant notes that the Examiner's arguments in support of this characterization appear to be based on the following suppositions:

- Zhang's teaching that LSA's are advertised into an area of the network teaches propagation of the LSA; and
- Zhang's teaching that received LSAs are used to "calculate routes to various destinations in the network" somehow shows "use" of the forwarding policy.

However, this line of argument, and the conclusion apparently drawn from it, are irrelevant to the wording of the claims.

More particularly, claims 1, 12 and 25 define: "controlling propagation of a received link state advertisement (LSA) message, into an area of the data network hosted by the ABR, using a respective forwarding policy having a match criteria corresponding to the asserted route tag".

Obviously, "calculating routes to various destinations" using a received LSA, and controlling propagation of a received LSA are radically different and entirely independent functions. Neither function teaches, suggests, requires or implies anything whatsoever about the other function.

Accordingly, it makes no difference what other functions the router might perform using a received LSA, and it does not matter whether or not the Examiner wishes to characterize such other functions as "use" of a forwarding policy; any function that does not control propagation of the received LSA into an area hosted by the ABR, fails to meet the limitations of the claims.

Finally, and as pointed out in Applicant's response filed January 7, 2008, the Examiner's alleged "forwarding rule" (that is, the forwarding data calculated based on received LSAs) cannot possibly be used to control propagation of received LSAs, as required by the claims. In particular, according to Zhang "when a router forwards a packet, the router determines the best "next hop" router by consulting a routing table maintained by the router. Known routing systems use the data packet's destination address as the lookup key in the routing table to determine the next hop router." [col. 1, lines 45-49]. Since an LSA does not contain a destination address, this operation of using the (non-existent) destination address to determine the next hop router plainly will not work.

In light of the foregoing, it is submitted that claims 1, 12 and 25 and their dependencies are in fact patentable under 35 U.S.C. § 102(e), over the teaching of United States Patent No. 6,275,492.(Zhang). Reconsideration and withdrawal of the claim rejections under 35 U.S.C. § 1023(e) in view of United States Patent No. 6,275,492.(Zhang) is believed to be in order, and such action is courteously solicited.

8) **Claims Appendix**

Claims involved in the Appeal

1. [PREVIOUSLY AMENDED] A method of enabling policy-based traffic forwarding in a data network having at least two area border routers (ABRs), the method comprising steps of:

generating a link state advertisement (LSA) message, and asserting a route tag in respect of the generated LSA message; and

at each ABR receiving the LSA message, controlling propagation of the received LSA, into an area of the data network hosted by the ABR, using a respective forwarding policy having a match criteria corresponding to the asserted route tag;

wherein the respective forwarding policy of a first ABR differs from that of a second ABR, such that the received LSA message is flooded into the area hosted by the first ABR, and not flooded into the respective area hosted by the second ABR.

2. [ORIGINAL] A method as claimed in claim 1, wherein the data network is an Open Shortest Path first (OSPF) network.

3. [ORIGINAL] A method as claimed in claim 1, wherein the route tag comprises one of:

an internal route tag associated with an address located within an autonomous system of the data network; and

an external route tag associated with an address located outside the autonomous system.

4. [PREVIOUSLY AMENDED] A method as claimed in claim 1, wherein the step of asserting a route tag comprises steps of:

setting a route tag value respecting the generated LSA; and

inserting the route tag value into a predetermined field of the generated LSA.

5. [PREVIOUSLY AMENDED] A method as claimed in claim 4, wherein the route tag value is set by a policy having a match criteria corresponding to a predetermined attribute of the generated LSA.

6. [PREVIOUSLY AMENDED] A method as claimed in claim 5, wherein the predetermined attribute comprises any one or more of: a source address; a source area; a destination address; and a destination area.

7. [PREVIOUSLY AMENDED] A method as claimed in claim 4, wherein the generated LSA is a Type-5 LSA, and the step of inserting the route tag comprises a step of inserting the route tag value into an external route tag field of the generated LSA.

8. [ORIGINAL] A method as claimed in claim 4, wherein the step of inserting the route tag comprises a step of inserting the route tag value into an internal route tag field of a modified Type-3 LSA.

9. [CANCELLED]

10. [PREVIOUSLY AMENDED] A method as claimed in claim 1, wherein the forwarding policy corresponds to one of:

a pass decision, in which the received LSA is forwarded to a downstream link; and

a discard decision, in which the received LSA is discarded without forwarding.

11. [PREVIOUSLY AMENDED] A method as claimed in claim 10, wherein implementation of the forwarding policy further comprises a step of updating a forwarding table using information contained in the received LSA as either one of: an inclusion route; and an exclusion route.

12. [PREVIOUSLY AMENDED] A router for enabling policy-based traffic forwarding in a data network having at least two routers, the router comprising means for controlling propagation of a received link state advertisement (LSA) message, into an area of the data network hosted by the router, using a respective forwarding policy

having a match criteria corresponding to a route tag asserted in respect of the LSA, wherein the forwarding policy of the router differs from that of a second router, such that the received LSA message is flooded into the area hosted by the router, and not flooded into a respective second area hosted by the second router.

13. [ORIGINAL] A router as claimed in claim 12, wherein the data network comprises an Open Shortest Path first (OSPF) network.

14. [ORIGINAL] A router as claimed in claim 13, wherein the router comprises any one of an autonomous system border router, and an area border router.

15. [ORIGINAL] A router as claimed in claim 12, wherein the route tag comprises one of:

an internal route tag associated with an address located within an autonomous system of the data network; and

an external route tag associated with an address located outside the autonomous system.

16. [CANCELLED]

17. [PREVIOUSLY AMENDED] A router as claimed in claim 12, wherein the forwarding policy corresponds to one of:

a pass decision, in which the LSA is forwarded to a downstream link; and

a discard decision, in which the LSA is discarded without forwarding.

18. [ORIGINAL] A router as claimed in claim 17, wherein the means for implementing the forwarding policy further comprises means for updating a forwarding table using information contained in the LSA as either one of: an inclusion route and an exclusion route.

19. [ORIGINAL] A router as claimed in claim 12, further comprising means for asserting the route tag in respect of the LSA.

20. [ORIGINAL] A router as claimed in claim 19, wherein the means for asserting the route tag comprises:

means for setting a route tag value respecting the LSA; and

means for inserting the route tag into a predetermined field of the LSA.

21. [ORIGINAL] A router as claimed in claim 20, wherein the means for setting the route tag value comprises a policy having a match criteria corresponding to one or more predetermined attributes of the LSA.

22. [ORIGINAL] A router as claimed in claim 21, wherein the one or more predetermined attributes comprise any one or more of: a source address; a source area; a destination address; and a destination area.

23. [ORIGINAL] A router as claimed in claim 20, wherein the router is an ASBR, and the means for inserting the route tag is adapted to insert the route tag value into an external route tag field of a Type-5 LSA.

24. [ORIGINAL] A router as claimed in claim 20, wherein the router is an ABR, and the means for inserting the route tag is adapted to insert the route tag value into an internal route tag field of a modified Type-3 LSA.

25. [PREVIOUSLY AMENDED] A software program stored on a computer readable medium for controlling a router to enable policy-based traffic forwarding in a data network having at least two routers, each router hosting an area of the data network, the software program comprising program code adapted to control propagation of a received link state advertisement (LSA) message, into a respective area of the data network hosted by the router, using a respective forwarding policy having a match criteria corresponding to a route tag asserted in respect of the LSA, wherein the respective forwarding policy of a first router differs from that of a second router, such that the received LSA message is flooded into the area hosted by the first router, and not flooded into a respective second area hosted by the second router.

26. [CANCELLED]

27. [PREVIOUSLY AMENDED] A software program as claimed in claim 25, wherein the program code adapted to implement the forwarding policy further comprises program code adapted to control the router to update a forwarding table using information contained in the LSA as either one of: an inclusion route and an exclusion route.

28. [PREVIOUSLY AMENDED] A software program as claimed in claim 25, further comprising program code adapted to control the router to assert the route tag in respect of the LSA.

29. [PREVIOUSLY AMENDED] A software program as claimed in claim 28, wherein the program code adapted to control the router to assert the route tag comprises:

program code adapted to control the router to set a route tag value respecting the LSA; and

program code adapted to control the router to insert the route tag into a predetermined field of the LSA.

30. [PREVIOUSLY AMENDED] A software program as claimed in claim 29, wherein the router is an ASBR, and the program code adapted to control the router to insert the route tag is adapted to control the router to insert the route tag value into an external route tag field of a Type-5 LSA.

31. [PREVIOUSLY AMENDED] A software program as claimed in claim 29, wherein the router is an ABR, and the program code adapted to control the router to insert the route tag is adapted to control the router to insert the route tag value into an internal route tag field of a modified Type-3 LSA.

9) Evidence Appendix

None

10) Related Proceedings Appendix

None

Early action in respect of this Appeal will be greatly appreciated.

Respectfully submitted,
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Enclosures